

### **REMARKS/ARGUMENTS**

Claims 1-24 are pending. Applicant confirms that claims 1-17 and 23-24 have been withdrawn from consideration in response to a prior restriction requirement. Claims 18-22 have been rejected for various reasons, detailed below. Reconsideration of this Application and entry of this Amendment is respectfully requested.

#### **35 U.S.C. §102 Rejections**

Claims 18, 19, 21 and 22 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Diamantopoulos et al., (US 2003/0120171). This rejection is respectfully traversed. The Applicant has thoroughly considered the contention of the Office Action concerning the patentability of claims 18, 19, 21 and 22 over Diamantopoulos. The Applicant has also thoroughly read the Diamantopoulos publication. In order for the Diamantopoulos publication to anticipate the invention as claimed in independent claim 18, the Diamantopoulos publication must disclose, teach, or suggest each and every claimed element of the Applicant's invention, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Referring to independent claim 18, the Diamantopoulos publication does not disclose, teach, or suggest, a system for determining vulnerable plaque in a cardiovascular lumen that includes, at a minimum, means for determining a distance from the temperature sensor to the cardiovascular wall with the distance sensor, means for adjusting the cardiovascular wall temperature measurement based on the distance determination, and means for determining the vulnerable plaque based on the adjusted cardiovascular wall temperature measurement, as recited in claim 18.

In rejecting claim 18, the Office Action cites to the Diamantopoulos publication para. 0032-0034 (reproduced below) for teaching "means for determining a distance from the temperature sensor to the cardiovascular wall with the distance sensor" as recited in claim 18.

[0032] Preferably, the thermography catheter comprises a radiopaque marker which aids in the location of the device by fluoroscopy during interventional surgery. More preferably, at least one sensor includes a marker so that it is discernible via fluoroscopy. Most preferably, individual sensors include different marker types, so that using fluoroscopy, the individual sensors can be identified and their spatial orientation and relative location to a desired part of the vessel wall thus clearly defined.

[0033] The distal tip may additionally comprise an ultrasound probe system that can give images of the arterial wall. This may be achieved by the incorporation to the distal catheter tip of a phased array of high-frequency ultrasonic crystals or a mechanical sector ultrasound element. In this way, intravascular ultrasound (IVUS) images may be captured simultaneously with the temperature data. This is extremely useful for morphological data acquisition, correctly recognizing the area of interest and for accurate catheter positioning.

[0034] The proximal section of the thermography catheter incorporates a connector for coupling the temperature data

signals to a remote device such as a personal computer. Preferably, the connector comprises  $n+1$  female plugs to assure proper transmittance of the electrical voltage signal transmitted from the sensors, where  $n$  is the number of sensors. These signals are transmitted along the wires from the sensors. The wires are preferably housed within the sheath and are preferably electrically isolated from the patient. Preferably, the wires are housed between the central lumen and the intermediate lumen, within the outer sheath. The  $n+1$  female plugs are connected to  $n$  sensor wires and 1 common ground.

[0035] According to a second aspect of the present inven-

However, at most, the Diamantopoulos publication teaches radiopaque markers to aid in the location of the device by fluoroscopy within the vasculature and an ultrasound probe system for providing ultrasound images of the vascular wall. The imaging system of the Diamantopoulos publication merely provides images of the vasculature wall to correctly identify the area of interest. Nothing within the cited portion, or the entirety of the Diamantopoulos publication, teaches means for determining a distance *from* the temperature sensor *to* the cardiovascular wall as claimed by the Applicant (emphasis added).

Additionally, the Diamantopoulos publication also does not teach means for *adjusting* the cardiovascular wall temperature measurement based on the distance determination, recited in claim 18 (emphasis added). At most, the Diamantopoulos publication teaches manipulating image data and temperature data to generate output in which the temperature data is mapped onto a corresponding position on an image of the vascular wall (see Diamantopoulos para. 0047, reproduced below).

[0047] According to a third aspect of the present invention, a computer program product comprises computer executable instructions for manipulating image data and temperature data to generate an output in which the temperature data is mapped onto a corresponding position on an image where that temperature data was detected to provide an integrated graphical image output, wherein the temperature data is thermography data that represents surface temperature at a vascular wall, and the image data is representative of the vascular wall morphology.

Thus, the Diamantopoulos publication does not teach or suggest means for *adjusting* the cardiovascular wall temperature measurement based on the distance determination as claimed and described by the Applicant. Furthermore, based on the fact that the Diamantopoulos publication does not teach means for adjusting the cardiovascular wall temperature measurement based on the distance determination the reference also does not teach means for determining the vulnerable plaque *based on the adjusted cardiovascular wall temperature* measurement recited in claim 18. Therefore, as each and every limitation of independent claim 18 is not taught or disclosed in the Diamantopoulos publication, claim 18 cannot be anticipated by the Diamantopoulos publication.

Claims 19 and 21-22 depend from independent claim 18 and include all the elements and limitations of independent claim 18. Therefore, dependent claims 19 and 21-22 are allowable over the Diamantopoulos publication for at least the same reasons as set forth above with respect to independent claim 18.

For these reasons, the withdrawal of the rejection of claims 18, 19, 21 and 22 under 35 U.S.C. § 102(e) is respectfully requested.

### **35 U.S.C. §103 Rejections**

Claim 20 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Diamantopoulos in view of Maahs et al., (US 2003/0176810). The Applicant traverses this rejection.

In order to sustain the rejection, each and every element of the claimed invention must be taught or suggested by the references, alone or in combination, in at least as great detail as claimed. Since the references do not teach or suggest each and every element, the rejection should be withdrawn.

As discussed above, the Diamantopoulos publication does not teach or suggest a system for determining vulnerable plaque in a cardiovascular lumen, that includes, at a minimum, means for determining a distance from the temperature sensor to the cardiovascular wall with the distance sensor, means for adjusting the cardiovascular wall temperature measurement based on the distance determination, and means for determining the vulnerable plaque based on the adjusted cardiovascular wall temperature measurement, as recited in claim 18. The Maahs publication does not cure this defect.

Claim 20 depends from independent claim 18 and includes all of the limitations of that claim. For at least this reason, claim 20 is patentable over the Diamantopoulos publication in view of the Maahs publication. Furthermore, where an independent claim is non-obvious, any claim depending therefrom is also non-obvious. See, MPEP 2143. The withdrawal of the rejection of claim 20 under 35 U.S.C § 103(a) is requested.

### CONCLUSION

Applicant respectfully requests that his application be reconsidered based on the forgoing. Applicant believes that the claims, that have not been withdrawn, are in condition for allowance and should be passed to issue. The Commissioner is hereby authorized to charge any additional fees which may be required under 37 CFR, or credit any overpayment, to Deposit Account No. 01-2525. If the Examiner feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned at telephone (978) 739-3250.

Respectfully submitted,

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